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ABSTRACT

Having implemented a testing procedure using the Gates-MacGinitie Reading Tests to identify recruits with reading deficiencies, the United States Navy conducted a study comparing the performance of recruits on three different reading tests. A total of 716 recruits completed the comprehension portion of the Gates-MacGinitie Reading Tests, the Tests of Adult Basic Education (TABE), and the Nelson-Denny Reading Tests. The results of the tests showed that the mean scores for the Gates-MacGinitie and the TABE, 11.04 and 10.32 respectively, were significantly different from the 9.65 mean score for the Nelson-Denny. The Nelson-Denny Reading Tests yielded a wider range of variability among the scores of the individual respondents as reflected by the standard deviation than did the Gates-MacGinitie Reading Tests or the TABE. Thus, the Nelson-Denny Tests did not appear to have any advantage over the reading tests currently being used by the Navy to measure recruit reading grade level. The Gates-MacGinitie Reading Tests have a number of test levels designed for particular grade levels, which the TABE does not have. The data suggest that the Gates-MacGinitie Reading Tests are best suited for the Navy's program. (HTH)

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A COMPARISON OF THREE READING TESTS FOR DETERMINING READING GRADE LEVEL OF NAVY RECRUITS

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INTRODUCTION

> In today's world, reading is the major avenue to learning and the educational system operates with learning to read as its highest priority. (1)

Even though learning to read is the highest priority of the public school, there is wide variability among its graduates with respect to this essential skill. The Navy, with its increasing sophistication in technology and training, requires individuals who have a solid foundation in reading (2).

The Navy implemented a testing procedure that involves the measurement of reading grade level. The procedure identifies those recruits with reading deficiencies so that they can be placed in a remedial program that is designed to upgrade the reading deficiencies to the extent that they can be successful in recruit training. The Gates-MacGinitie Reading Tests are currently used as the measuring device for determining each recruit's reading grade level (7). Although the Gates-MacGinitie Reading Tests appear to be effective in identifying those recruits who are in need of remedial reading, individuals both from within and outside the Navy training command still question their use. They want to know "why" the Navy does not use any number of other instruments to measure reading grade level.

Purpose

The primary purpose of this study was to investigate the performance of Navy recruits on three different reading tests. The recruits completed the comprehension portion of the Gates-MacGinitie Reading Tests and Tests of Adult Basic Education (TABE) and Nelson-Denny Reading Tests.

SUBJECTS AND INSTRUMENTATION

Recruits from each Recruit Training Center (NAVCRUITRACOM) were selected as respondents to the instruments. The number of respondents by NAVCRUITRACOM was 300 for San Diego, 304 for Great Lakes, and 378 for Orlando. The total sample across the three NAVCRUITRACOM's was 982, however, only 716 usable subjects was available for any test combination because all recruits did not respond to each instrument . Table 1 shows the breakdown of subject respondents by test and by NAVCRUITRACOM. It was not possible for all respondents to complete each of the three tests (this only happened at San Diego). The respondents at Great Lakes and Orlando completed either the Nelson-Denny or the TABE in combination with the Gates-MacGinitie which is taken by all Navy recruits. The analyses that required the use of subjects who had taken each of the three tests were limited to the San Diego sample.

The comprehension section of the Gates-MacGinitie Reading Tests, Levels D, E, and F, were administered (3). The comprehension section of these tests requires 35 minutes to administer and the respondent completes 43 items. The data can be reported on several different scales, such as raw scores, grade equivalents, and scaled scores. The Nelson-Denny Reading Test has a 20-minute administration time for 36 items (5) whereas the TABE has a 40-minute

TABLE 1

NUMBER OF RESPONDENTS BY TEST
AND RECRUIT TRAINING CENTER

TEST	RECRUIT TRAINING CENTER			
	SAN DIEGO	GREAT LAKES	ORLANDO	TOTAL
Gates-MacGinitie	100	152	189	441
Nelson-Denny	100	73	92	265
TABE	100	79	97	276
TOTAL	300	304	378	982

TABLE 2

ADMINISTRATION TIME AND NUMBER OF ITEMS BY TEST

TEST	ADMINISTRATION TIME	NUMBER OF ITEMS*
Gates-MacGinitie	35 min.	43
Nelson-Denny	20 min.	36
TABE	40 min.	45

* Comprehension section only

TABLE 3

NORMATIVE DATA BY TYPE AND TEST

TYPE OF DATA	GATES-MACGINITIE	NELSON-DENNY	TABE*
Raw Score	X	X	X
Grade Equivalent	X	X	X
Total Score	X	X	X
Subtest Scores			
Vocabulary	X	X	X
Comprehension	X	X	X
Reading Rate	-	X	-
Stanine	X	X	-
Standard Score	X	X	-
Percentile Rank	X	X	-
Normal Curve Equivalent	X	—	—
Scaled Score	X	-	X

*The TABE has normative data for reading, mathematics, and language.

administration time for 45 items (4). Table 2 shows the time required for administration of each test.

The data that were generated from each instrument can be presented in various forms. Table 3 shows the types of presentations that can be made based upon the purposes that one has for obtaining the data. For example, raw score can be presented that represents the sum of the correct responses by an individual on the test. Stanine scores divide the achievement continuum into nine segments based on equal-sized percentile ranges. These scores help to take into account the range of scores that a student might obtain with repeated testings.

Grade equivalents, on the other hand, rank the achievement of a student within a group that includes the students in all grades. Thus, a grade equivalent of 11.2 indicates that the individual has done about as well on the test as one would expect an average student to do on the same test after being in the 11th grade for 2 months.

Percentile rank indicates where an individual raw score fits in a set of scores for a particular grade level. It tells the percentage of scores at that grade level that are equal to or lower than it is. The normal curve equivalent score describes a student's level of achievement in terms of relative standing. It is based on percentile rank. (3).

RESULTS

Data on the distribution of the sample by age and sex are shown in Table 4. The age range for males was 17 to 34 years and for females was 17 to 33 years. The sample consisted of 345 males and 96 females. Inspection of the data indicates that 77.4 percent of the sample was 20 years of age or younger with the highest percentage (39 percent) of the recruits being 18 years of age upon entry into the Navy. (It should be noted that the 716 sample mentioned earlier is a result of multiple testing, that is a respondent takes both the Gates-MacGinitie and one of the other tests.)

An analysis of variance of reading scores for recruits at NAVCRUITRACOM San Diego, those who completed all three reading tests, is provided in Table 5. The data indicates an F ratio of 6.3 with 299 total degrees of freedom. This F ratio results in a probability of 0.002 which is statistically significant beyond the .05 level of confidence. Thus, there is a significant difference between the mean scores of the respondents on the three reading tests.

The information in Table 6 shows that the mean scores for the Gates-MacGinitie were significantly different than those for the Nelson-Denney. The mean score was 11.04 for the Gates and 9.65 for the Nelson-Denny. The mean score for the TABE was 10.32; it was also, significantly different from the Nelson-Denny. The Nelson-Denny yielded a mean score of 9.65 with a standard deviation of 3.87. Its 95 percent confidence interval (8.8 to 10.42) indicates a wider variability among the individual scores of the respondents (6) than does the other two tests.

A comparison of mean scores for the Gates-MacGinitie and Nelson-Denny for recruits across all three NAVCRUITRACOM's resulted in an F ratio of 6.16 which is statistically significant beyond the .05 level, the standard deviations were 2.09 for the Gates and 1.86 for the TABE. Table 7 indicates that the mean for the Gates-MacGinitie was 11.26 and the Nelson-Denny was 10.73. Subsequent review of the standard deviations indicates that the Nelson-Denny has a wider range of variability among individual scores than does the Gates-MacGinitie. This wide range of variability is clearly shown when the standard deviations are compared.

The comparison of the Gates-MacGinitie and the TABE yielded an F ratio of 10.20 which is statistically significant beyond the .05 level (Table 8). The mean score for the Gates-MacGinitie is 11.26 and for the TABE is 10.78. The standard deviations are both 1.9. This review simply indicates that there was a difference in mean scores.

Analyses were conducted to compare mean scores for the Gates-MacGinitie across NAVCRUITRACOM's (Table 9). The result was that the mean scores at Orlando were significantly higher than those at the other two NAVCRUITRACOM's. This difference can be attributed to the scores of the female recruits because they tend to obtain higher reading scores than do the male recruits. Therefore, Orlando, the only NAVCRUITRACOM with female recruits, would have higher mean reading scores than would the other two NAVCRUITRACOM's. Table 9 shows that Orlando had a mean score of 11.59 whereas Great Lakes and San Diego were 10.00 and 11.04, respectively, with regard to reading scores by sex as measured by the Gates-MacGinitie Reading Tests.

TABLE 4

DISTRIBUTION OF SAMPLE BY AGE AND SEX

	SEX					
	MALE		FEMALE		TOTAL	
AGE	N	%	N	%	N	%
17 years	13	2.9	2	.5	15	3.4
18	138	31.3	34	7.7	172	39.0
19	87	19.7	15	3.4	102	23.1
20	36	8.2	14	3.2	50	11.3
21	22	5.0	11	2.5	33	7.5
22	18	4.1	4	.9	22	5.0
23	9	2.0	6	1.4	15	3.4
24	6	1.4	1	.2	7	1.6
25+up	16	3.7	9	2.1	25	5.8
TOTAL	345		96		441	

Age Range:
Male 17-34 years
Female 17-33 years

TABLE 5

ANALYSIS OF VARIANCE OF READING SCORES
FOR RECRUITS COMPLETING THE
GATES MACGINITIE, TABE, AND NELSON-DENNY TESTS

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	F PROB.
Between Groups	2	95.97	47.99	6.3	0.002
Within Groups	297	2261.67	7.61		
TOTAL	299	2357.64			

TABLE 6

MEAN SCORE, STANDARD DEVIATION, AND
CONFIDENCE INTERVAL FOR MEAN BY TEST

TEST	MEAN SCORE	STANDARD DEVIATION	95 PERCENT CONFIDENCE INTERVAL FOR MEAN
Gates-MacGinitie	11.04	2.09	10.62 to 11.45
Nelson-Denny	9.65	3.87	8.88 to 10.42
TABE	10.32	1.86	9.95 to 10.68

TABLE 7

ANALYSIS OF VARIANCE OF READING SCORES FOR RECRUITS
AT ALL SITES COMPLETING THE GATES-MACGINITIE READING TESTS
AND NELSON-DENNY READING TEST

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	F PROB.
Between Groups	1	47.40	47.4	6.16	0.013
Within Groups	704	5416.43	7.69		
TOTAL	705	5463.83			

Mean Scores:		Standard Deviation
Gates	= 11.26	1.98
Nelson-Denney	= 10.73	3.73

TABLE 8

ANALYSIS OF VARIANCE OF READING SCORES FOR RECRUITS
COMPLETING THE TABE AND THE GATES-MACGINITIE READING TESTS

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	F PROB
Between Groups	1	38.97	38.97	10.20	0.002
Within Groups	715	2731.91	3.82		
TOTAL	716	2770.88			

Mean Scores:	Standard Deviation
Gates = 11.26	1.9
TABE = 10.78	1.9

TABLE 9

ANALYSIS OF VARIANCE OF READING SCORES FOR RECRUITS AT
EACH RECRUIT TRAINING CENTER COMPLETING THE GATES-MACGINITIE READING TESTS

SOURCE OF VARIANCE	DEGRESS OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F RATIO	F PROB.
Between Groups	2	36.69	18.34	4.74	.009
Within Groups	438	1694.98	3.87		
TOTAL	440	1731.67			

Mean Scores:
Orlando = 11.59
Great Lakes = 10.99
San Diego = 11.04

CONCLUSIONS

The reading scores for recruits at each NAVCRUITRACOM on the Gates-MacGinitie Reading Tests tend to be similar except when impacted by the scores of female recruits. The scores of the females are higher than those of the males. When the reading scores for females are included in a sample, the mean reading grade level scores are higher. Therefore, mean of the reading scores for Recruit Training Center, Orlando, is significantly higher than are the means for the other NAVCRUITRACOM's.

A comparison of mean scores for all three tests taken by the San Diego sample as well as an independent comparison across all NAVCRUITRACOM's indicate that the Nelson-Denny Reading Test yields a wider range of variability among the scores of the individual respondents as reflected by the standard deviation than does the Gates-MacGinitie Reading Tests or the Tests of Adult Basic Education. Thus, it does not appear to have any advantage over the reading test currently being used by the Navy to measure recruit reading grade level.

The Tests of Adult Basic Education compares favorably with the Gates-MacGinitie Reading Tests in terms of variability of individual respondent scores. Each test appears to have a narrow band of variability resulting in consistent measurement. Test administration time for the comprehension section of each test is approximately equal. There is no advantage gained for using either test when compared in terms of variability or administration time.

The Gates-MacGinitie Reading Test has one distinct advantage over the Test of Adult Basic Education. It has a number of test levels designed for particular grade levels. These range from Level R, designed for grades 1.0 - 1.9, to Level F, designed for grade 10-12. The Test of Adult Basic Education has only three levels. The lowest level is E, designed for grades 2.5 through 4.9, and the highest level is D, designed for grades 6.5 - 8.9. This range of levels and grade ranges give the Gates-MacGinitie Reading Test a distinct advantage over the TABE because the Navy utilizes multi-level testing for reading.

The Gates-MacGinitie Reading Test, based on the data from this report, is best suited for use by the Navy. The comprehension section is easy to administer, suitable with regard to testing time required for administration, and normed for a variety of grade levels to enable multi-level testing. The data from this study support the suitability of the Gates-MacGinitie Reading Test for multi-level testing of reading for recruits.

RECOMMENDATION

The Navy should retain the Gates-MacGinitie Reading Tests for screening on recruit reading grade level. It should continue to administer Levels D, E, and F for its multi-level testing process.

The Navy should utilize the Gates-MacGinitie Reading Tests in all programs that require reading grade level scores. The instrument has minimal variability between scores. It also has positive factors of short administration time and several forms for capability of multi-level testing.

REFERENCES

1. Zintz, Miles V. and Maggort, Zelda R. The Reading Process: The Teach and The Learner, 4th Ed., W. C. Brown Publishers, Dubuque, Iowa, 1984.

2. Chief of Naval Technical Training. Literacy Skills Curriculum for Academic Remedial Training, 31 August 1979.

3. MacGinitie, Walter, Kamons, Joyce, etal. Gates-MacGinitie Reading Tests, Teacher's Manual, Level F, Houghton Mifflin Company, Boston, MA, 1978.

4. Tests of Adult Basic Education (TABE), Examiner's Manual, Level D, CTB/McGraw-Hill, Monterey, CA, 1976.

5. Brown, James, Bennett, J. Michael, and Hanna, Gerald. The Nelson-Denny Reading Test, Examiner's Manual, The Riverside Publishing Company, New York, 1981.

6. Popham, W. James. Educational Statistics, Use and Interpretation, Harper and Row, Publishers, New York, 1967.

7. Brown, Cheryl J. and Kincaid, J. Peter. Use of the ASVAB For Assignment of Gates-MacGinitie Reading Test Levels, Technical Memorandum 82-4, July, 1982. Training Analysis and Evaluation Group, Orlando, FL 32813.